STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

A Report of a Condition Survey
of
State Highways in District I
in the
Counties of Mendocino, Humboldt and Del Norte
With Special Reference to the Effects of Heavy Truck Hauling

Mai

Materials and Research Engineer

September 4, 1953

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Department of Public Works
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DIVISION OF HIGHWAYS
PUBLIC WORKS BUILDING
P. O. BOX 1499
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PLEASE REFER TO
FILE NO.

September 4, 1953

Mr. G. T. McCoy
State Highway Engineer
Division of Highways
Sacramento, California

Dear Mr. McCoy:

In accordance with your instructions, a condition study has been made of the State highways in District I which are used by the lumber industry primarily in the transporting of logs and lumber by heavy trucks.

Six copies of this report are attached.

G. F. Hellesoe

G. F. HELLESOE
Maintenance Engineer

F. N. Hveem

F. N. HVEEM
Materials & Research Engr.

STATE OF CALIFORNIA
DIVISION OF HIGHWAYS

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Counties of Mendocino, Humboldt and Del Norte
With Special Reference to the Effects of Heavy Truck Hauling

By

G. F. Hellesoe
Maintenance Engineer

and

F. N. Hveem
Materials and Research Engineer

September 4, 1953

Part I

General Outline and Conclusions

The following portions of routes in Mendocino, Humboldt and Del Norte Counties were selected as covering those State Highways generally used by the Lumber Industry for heavy truck hauling.

(1) The Redwood Highway from Ukiah in Mendocino County to Crescent City in Del Norte County

(2) Route 71 from Crescent City to the Oregon State Line in Del Norte County.

(3) Route 20 from Arcata to Willow Creek in Humboldt County.

(4) Route 35 from Alton to Bridgeville in Humboldt County.

(5) Route 48 from Junction of Route 56 at Navarro to near McDonald in Mendocino County.

(6) Route 56 from Westport to Junction of Route 48 at Navarro in Mendocino County.

This listing totals 430 miles of State Highways and includes all of those portions on which log and lumber hauling is an important phase of traffic use. In standard, the roads range from minor improved County construction taken into the State System, early State Highway construction with little subsequent improvement, to sections recently improved to modern standards of design.

The study was made in order to determine whether or not the road surfaces of these highways are structurally adequate to carry a greater than legal load as determined by the California Vehicle Code.

A field inspection was first made of the highways listed and by evidence of surface weakness or distress noted by careful observance, the road surfaces were classified as to condition. Following this preliminary survey, a very thorough search was made of Departmental records in order to determine the type and thickness of base materials and surfacing that have been placed on each section. Data from Laboratory tests were examined with particular attention paid to those requirements on which the more recent construction was designed. Pavement deflection gauges were installed at seven different locations in order to measure the depth and degree to which heavy truck loads are affecting the pavement foundation. Traffic data, with especial note made of the exceedingly rapid growth in volume of five-axle trucks, was studied and its effect upon the pavement analyzed. Maintenance cost records were examined as well as the more recent cost of resurfacing and used as an index to the damage which the roads have suffered in the past.

The following pages include a more detailed discussion, together with charts representing each section of highway on which are indicated the thickness and type of base and pavement the present condition of surface, volume of trucks for each year since 1946, pavement deflection data and maintenance costs.

In consideration of all factors involved and from the examination and study of both old and new pavements, it does not appear that there is any measurable factor of safety even in the best-appearing and the most recently constructed modern sections of highway in this area. These more modern sections of road were designed to carry only legal loads and allowance was made for the normal rate of increase in number of vehicles. It must be emphasized, however, that most of these sections designated as now in excellent condition have been under traffic only from one to seven years and therefore have not yet been subjected to the number of loads for which they were designed. The records indicate that the increase in the number of five-axle trucks has greatly exceeded the rate indicated five years ago. It is our opinion that on these roads even the sections now classed as excellent will not support loads exceeding the present legal limits and that there is sufficient evidence to show that even legal loading with present volumes of traffic will lead to more rapid deterioration than was expected. It is evident that much of the older and lighter constructed sections are not structurally adequate to carry the present volume of truck traffic with axle loading held within legal limits except with continued excessive repairs and heavy maintenance expenditure.

The study clearly indicates that if legal axle load limits are raised on any of the existing highways listed herein, the result will be increased cost of maintenance and a reduced service life of the pavement structure.

Part II

Maintenance Costs on Pavements Subjected to Heavy Truck Traffic in the Counties of Mendocino, Humboldt and Del Norte

While in particular instances, effects other than traffic use may influence the cost of traveled way maintenance, it is evident throughout the State that these costs do reflect the structural sufficiency of the base and surface to carry the traffic load. This premise is applicable to those highways in District I included in the study. Indicated on the attached charts, Figures 1 to 6, are the traveled way maintenance costs by sections of those roads for the 1952-53 fiscal year. These costs are those incurred in the repair of damage to pavements by traffic use only and do not include the cost of repair of damage by slides, slip-outs, or other storm damage.

It should be noted that, in general, traveled way maintenance costs on sections recently constructed to adequate standards are comparatively low while those sections on which the base and surfacing is admittedly inadequate are relatively excessive. These costs are even more startling when compared with traveled way maintenance costs throughout the State System. The average yearly traveled way maintenance cost for the entire State System of 14,000 miles, including State highways in District I for the five fiscal years 1947-48 to 1951-52 was $591 per mile as compared to an average cost of $1526 per mile for the same period on those roads included in this study.

The foregoing indicates that the average cost for the highways in District I is greater than for the state as a whole. It is also true that the costs vary widely within the district, generally in accord with the structural adequacy of the highway. For example, a study of the 1953 maintenance costs for repair of surface courses indicates that the sections rated as good or excellent required an average of $327 per mile per year whereas the sections rated as poor to fair show an average of $1610 per mile per year.

Log hauling by trucks using maximum loading has only been active in recent years, and it has been experienced in District I that various sections of highway subject to this heavy hauling have suffered damage to the existing surface amounting to entire destruction in many cases. During the period 1947-1952, it has been necessary to resurface with a much heavier design 49 miles of the Redwood Highway at a cost of $2,000,000. Currently, contracts are under way for resurfacing of an additional 20 miles on the same highway at a cost of $700,000. The apparent adequacy of the structural design of these jobs and ability to carry current loading as indicated by their generally good condition and low maintenance costs does not indicate, however, that load limits can be raised. These sections have only been improved a relatively short time as compared to their anticipated life and while generally good, there are in some locations already signs of structural failure which can be charged against traffic use.

In summarizing, it must be stated that based on the maintenance costs of traveled way, there are many sections of highway in District I included in this study on which the existing base and surface is entirely inadequate to carry the current volume of heavy truck loading within legal limits.

Part III

Structural Adequacy of Pavements Subjected to Heavy Logging Traffic in the Counties of Mendocino, Humboldt and Del Norte

A survey of the structural adequacy of highways subjected to log hauling in District I indicates that they include old county built roads which were taken into the State highway system, lightly built state highways constructed many years ago and modern examples with heavier bases and subbases. There is today a marked contrast between the appearance of the old and new sections of highway. Aside from the differences in roadway width and alignment, the pavements and road surfaces constructed in the past five or six years are in far better condition and apparently are adequate to carry the traffic for which they were designed.

The attached charts, Figures 1 to 7, are strip maps on which is shown in graphic form the relative thickness of base and surfacing that has been placed throughout the years on individual sections and subsections of the highways under discussion. The general condition of each section as of July 1953 is shown in the form of a colored bar graph in which the present condition and the ability of the road to carry modern traffic within legal load limits are indicated in terms such as "poor," "fair," "good" and "excellent." It should be noted in passing that this condition survey was made at the most favorable time of the year when most of the winter and spring damage had been temporarily corrected by maintenance. Until recent years the type of pavement or wearing surface on these highways ranged from thin surface treatments up to substantial plant-mix pavements placed over gravel, crushed stone, or imported borrow materials. When first constructed, all of these road surfaces were smooth riding and gave a good appearance, although, as indicated on the chart, the majority of these older pavements cannot now be classed as better than fair and a considerable portion is definitely poor.

Virtually all of the roads included in this study traverse areas subjected to heavy rainfall and through terrain that is often unstable and where poor soils and weak foundations are of frequent occurrence. It is a difficult matter today to evaluate the load carrying capacity of the older pavements constructed over gravel bases. With the passage of time and under the heavy truck loads, many of these gravel bases have become contaminated with fine soil or clay and there is reason to believe that many of these gravels are subject to definite degradation under heavy traffic and therefore contain a greater percentage of fine material today than when first placed on the roadbed. Under the generally moist conditions that are characteristic of this region these bases are less stable today than when first constructed. This evidence of deterioration and lack of permanence in the gravel bases has led to an increased use of stabilized bases and in the 430 miles of road covered by this report we now have approximately 72 miles where the asphalt pavement is supported by a cement treated base which in turn rests upon very substantial layers of gravel or other granular material.

Referring to the attached charts, Figures 1, 2 and 3, the majority of the sections constructed within the last five or six years have been classed as excellent. It must be borne in mind, however, that these roads were designed to carry the traffic which was anticipated at the time when these newer sections were designed. In other words, a project planned in 1946 or 1948 was expected to carry the traffic which was then operating over these sections plus an allowance for increase over a period of ten years. The actual increase in traffic, especially in the form of heavy trucks engaged in log hauling, is considerably greater than could have been inferred from the traffic data available in 1948, for example. To illustrate this increase, figures are placed on the charts, Figures 1 to 7, showing the traffic recorded at each of the established census stations, both for 1948 and for 1953. It will be noted that for all stations listed in this survey there is an average increase from 48 in 1948 to 216 5-axle trucks per day in 1953. The majority of the 5-axle trucks operating on these highways are used for hauling either logs or lumber, and according to available evidence, habitually carry axle loads that probably average not far below the legal limit. Figures 8 to 16 show in graphic form the number of trucks equipped with 3, 4, 5 and 6 axles that were recorded during July of each year from 1946 to 1953. These charts show clearly the marked change in rate of increase which began about 1949 and which has continued up to the present time. These charts also show clearly that any estimates for design purposes that were based upon the rates of increase prior to 1949 would be far short of the actual traffic which is operating on these roads today. The effects of heavy hauling are sharply indicated by the contrast between pavement lanes where loaded trucks are hauling primarily in one direction with only incidental heavy loads in the opposite lane.

The ability of highway pavements to sustain traffic loads is, in general, limited by two different considerations.

1. Tendency to distortion or plastic deformation that results from lubrication in the base courses caused by water and aggravated by fine clay-like materials.

2. Cracking and breaking up of the pavement surface due to the flexing which occurs under the passage of heavy wheel loads.

The deflection of highway pavements under heavy wheel loads is becoming a matter for considerable concern on most roads where heavy trucks are operating and there is accumulating evidence to show that heavy axle loads are affecting the roadbed to depths heretofore unsuspected by most engineers. Chart, Figure 17, illustrates the amount of deflection or compression in the foundation which is occurring to a depth of nine feet below the pavement surface. These values were measured by deflection gages placed at six locations in the general vicinity of Eureka. One of these gages was placed in a section classed as excellent, one in an area rated as good, and 4 in areas classed as poor either by present appearance or by the record of maintenance costs. The values shown on Figure 17 furnish definite proof that each passing vehicle load has a measurable effect down to a depth of at least nine feet and it is known that, in many cases, the movement extends to even greater depths. We wish to point out that the depth of gravel or base material which has been placed on any of these highways rarely exceeds 24 inches and on the older roads the total thickness is usually less than 14 inches. This graph shows that the sections rated as poor are all undergoing a greater deflection with each passing load than are the sections rated as excellent and it will be noted that in all cases the magnitude of the deflection increases in direct proportion to the increase in axle load and is obviously greater over the poor soils and weak foundations of the older roads. It is interesting to note that for the bituminous pavements supported by gravel bases the deflection caused by tandem axles loaded to 32,000 pounds is almost exactly the same in each case as the deflection caused by a single axle loaded to 18,000 pounds. For the conditions existing in District I, it appears, therefore, that there is reasonable comparability between the present legal load limits for single axle and tandem axle vehicles. There is evidence, however, that tandem axle loads of 32,000 lbs. are considerably more destructive than single axle 18,000 lb. loads on rigid types of pavements and bases of which there is only a limited mileage in District I.

Chart, Figure 17, shows deflections when the wheels are directly over the gage installation. Figure 18 shows the magnitude of deflections developed under a 14,000 pound single axle load when the truck wheels were at various positions with reference to the deflection gage. In this chart, the horizontal distance between the gage and the truck wheels is shown and the deflection recorded at the gage for each of the wheel positions is indicated by the vertical scale.

As stated above, these deflection measurements show that there is an increase in deflection with an increase in axle load. Data obtained from test highways and from several different sources indicate also that the damage caused by vehicle traffic increases with the repetition of loads, and it appears that the

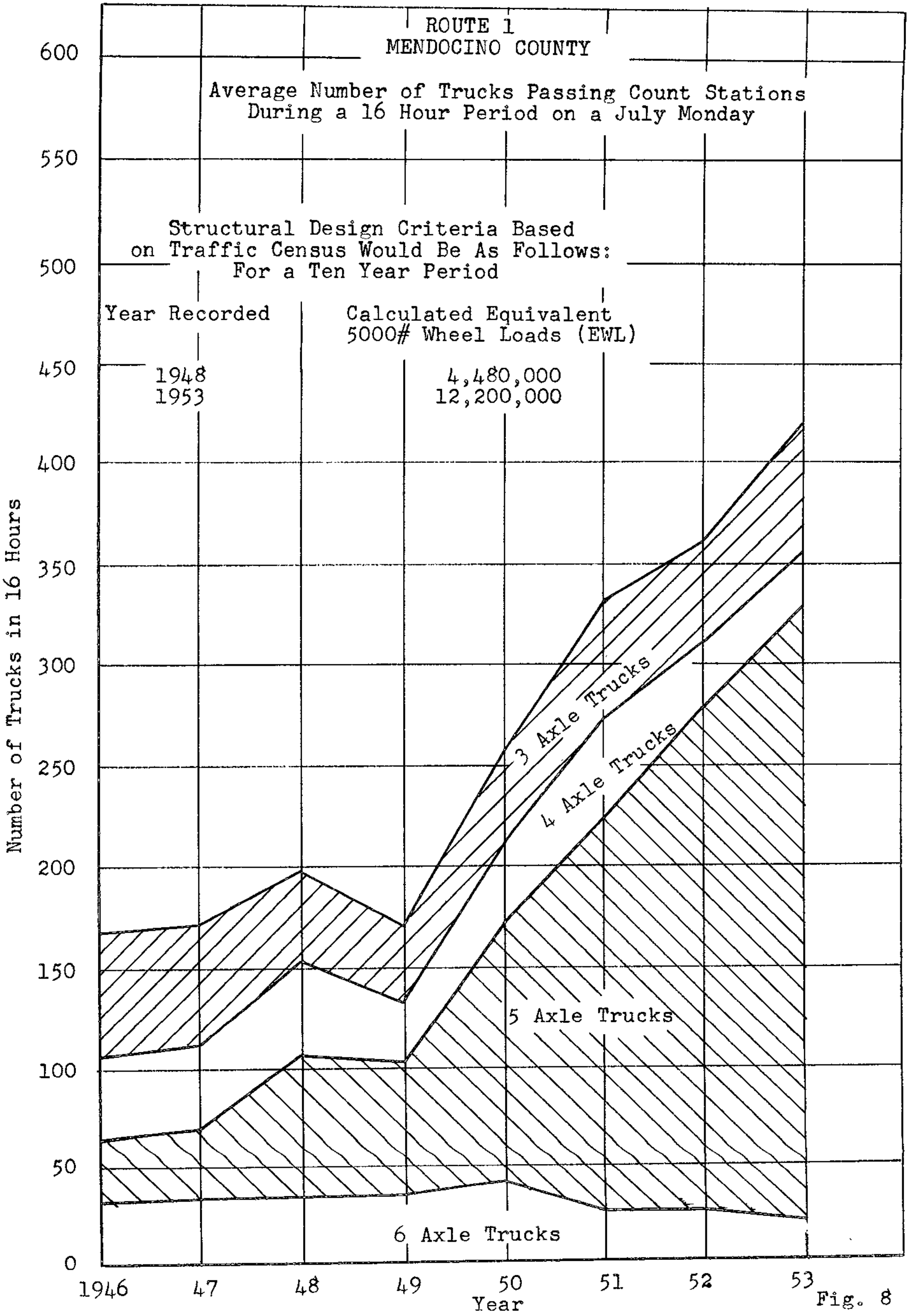
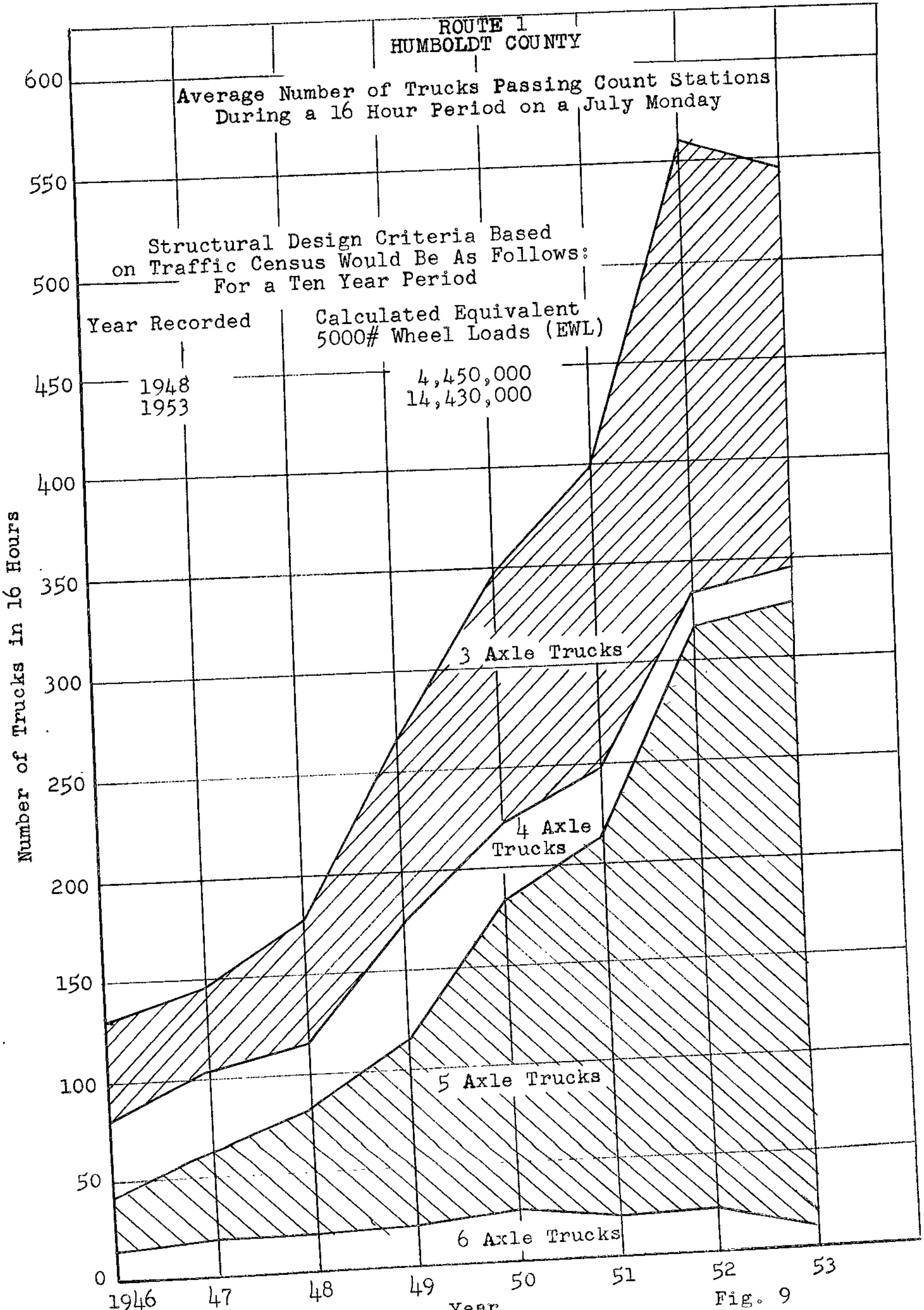
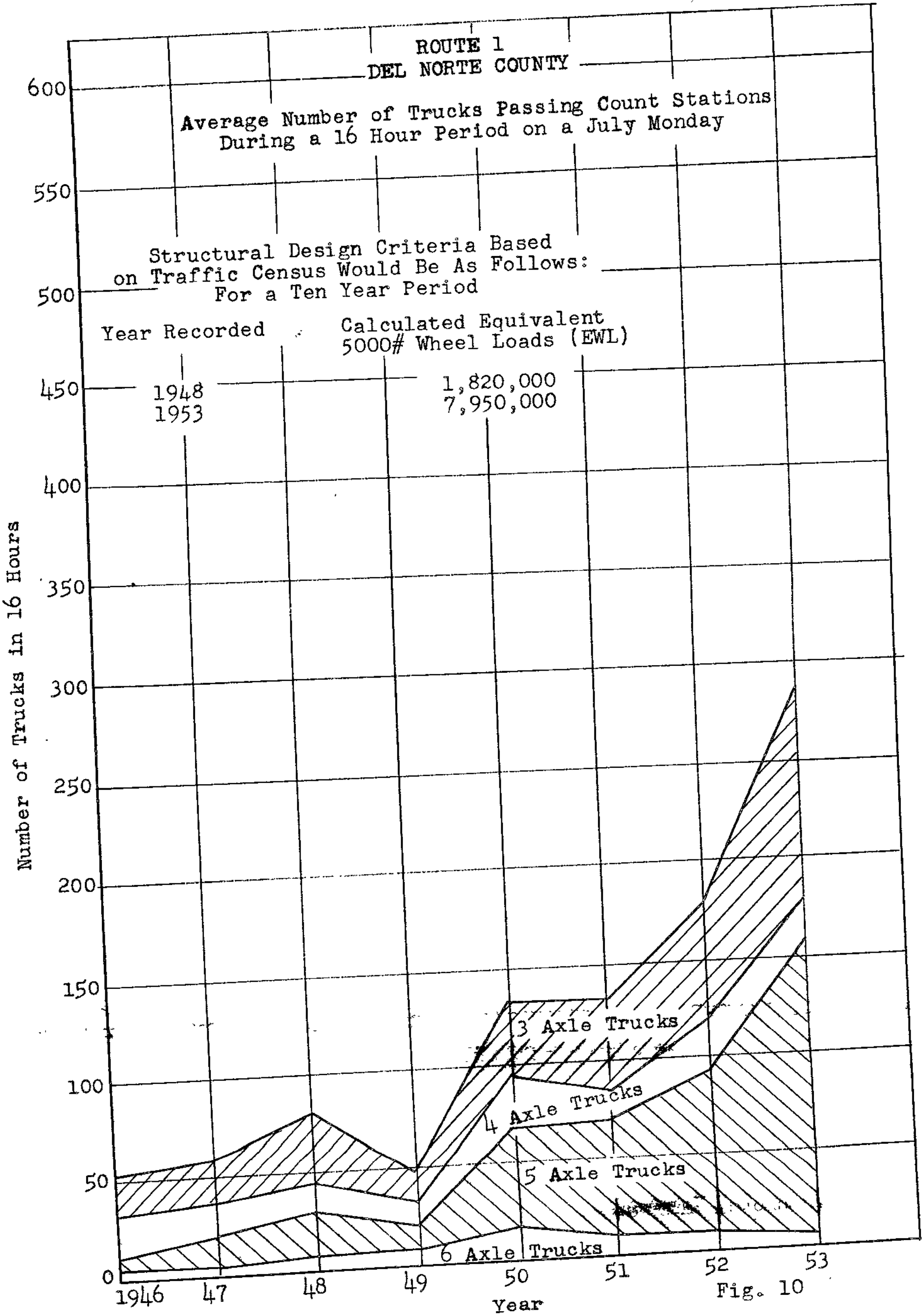

ROUTE 1
MENDOCINO COUNTY
Average Number of Trucks Passing Count Stations
During a 16 Hour Period on a July Monday
Structural Design Criteria Based
on Traffic Census Would Be As Follows:
For a Ten Year Period
Year Recorded
Calculated Equivalent
5000# Wheel Loads (EWL)
1948
4,480,000
1953
12,200,000
3 Axle Trucks
4 Axle Trucks
5 Axle Trucks
6 Axle Trucks
Number of Trucks in 16 Hours
0
50
100
150
200
250
300
350
400
450
500
550
600
1946
47
48
49
50
51
52
53
Year

Fig. 8

destructive effect for loads of this type is in proportion to the logarithm of the number of axle load repetitions. Thus, a pavement that would show no apparent damage after the passage of one or a dozen trips of a heavily loaded truck will often fail completely from fatigue after the same load has been repeated a greater number of times.

To summarize, the structural adequacy of pavements on the 430 miles studied in District I ranges from lightly constructed sections that have been added to and reinforced by maintenance operations throughout the years up to modern relatively heavy sections better suited to present day traffic. The older sections are in generally poor condition requiring heavy annual maintenance expenditures to maintain in reasonable condition and could not be considered to be adequate for present day truck traffic even if loads were maintained within legal limits. The newer sections presenting a much better condition appear to be approximately adequate for the present day traffic and should give satisfactory service for the period of time contemplated in the design. Deflection measurements made in the vicinity of Eureka and elsewhere in the State show that heavy truck loads are depressing the foundations to considerable depths, and in many cases it was found that measurable deflections existed as far as 18 feet below the pavement surface. It is evident that only heavy pavements and thick base courses will serve to reduce these deflections to a point which the pavement can withstand. The foregoing study clearly shows that these road surfaces in District I are neither heavy enough nor strong enough to warrant any increase in the present legal load limits.


ROUTE 1
HUMBOLDT COUNTY
Average Number of Trucks Passing Count Stations
During a 16 Hour Period on a July Monday
Structural Design Criteria Based
on Traffic Census Would Be As Follows:
For a Ten Year Period
Year Recorded
Calculated Equivalent
5000# Wheel Loads (EWL)
1948
1953
4,450,000
14,430,000
3 Axle Trucks
4 Axle
Trucks
5 Axle Trucks
6 Axle Trucks
Number of Trucks in 16 Hours
600
550
500
450
400
350
300
250
200
150
100
50
0
1946
47
48
49
50
51
52
53
Year
Fig. 9


ROUTE 1
DEL NORTE COUNTY
Average Number of Trucks Passing Count Stations
During a 16 Hour Period on a July Monday
Structural Design Criteria Based
on Traffic Census Would Be As Follows:
For a Ten Year Period
Year Recorded
Calculated Equivalent
5000# Wheel Loads (EWL)
1948
1953
1,820,000
7,950,000
3 Axle Trucks
4 Axle Trucks
5 Axle Trucks
6 Axle Trucks
Number of Trucks in 16 Hours
Year
0
50
100
150
200
250
300
350
400
450
500
550
600
1946
47
48
49
50
51
52
53
Fig. 10

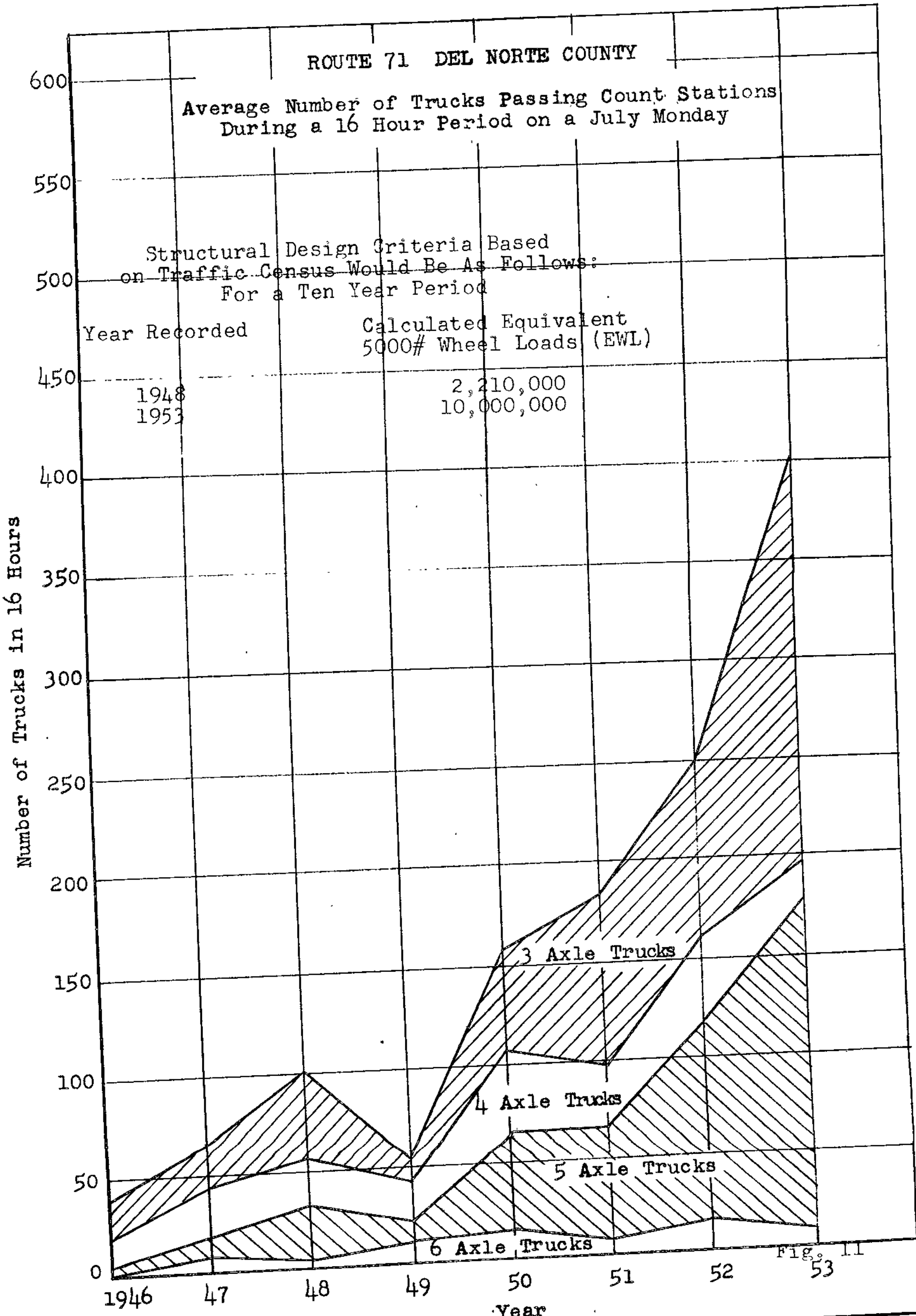

ROUTE 71 DEL NORTE COUNTY
Average Number of Trucks Passing Count Stations
During a 16 Hour Period on a July Monday
Structural Design Criteria Based
on Traffic Census Would Be As Follows:
For a Ten Year Period
Year Recorded
Calculated Equivalent
5000# Wheel Loads (EWL)
1948
2,210,000
1953
10,000,000
3 Axle Trucks
4 Axle Trucks
5 Axle Trucks
6 Axle Trucks
Number of Trucks in 16 Hours
600
550
500
450
400
350
300
250
200
150
100
50
0
1946
47
48
49
50
51
52
53
Year

Fig. 11

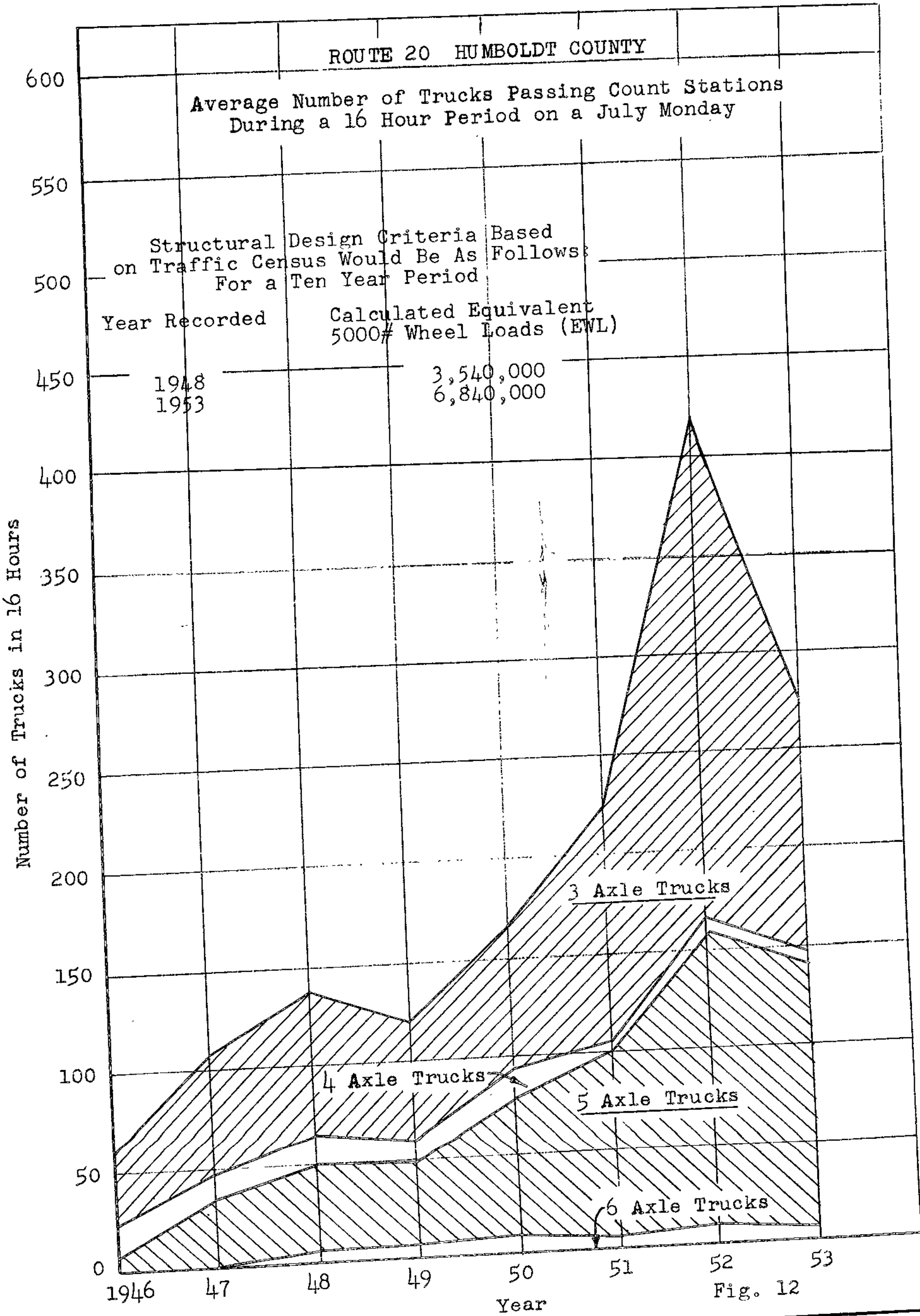

ROUTE 20 HUMBOLDT COUNTY
Average Number of Trucks Passing Count Stations
During a 16 Hour Period on a July Monday
Structural Design Criteria Based
on Traffic Census Would Be As Follows:
For a Ten Year Period
Year Recorded
Calculated Equivalent
5000# Wheel Loads (EWL)
1948
1953
3,540,000
6,840,000
3 Axle Trucks
4 Axle Trucks
5 Axle Trucks
6 Axle Trucks
Number of Trucks in 16 Hours
600
550
500
450
400
350
300
250
200
150
100
50
0
1946
47
48
49
50
51
52
53
Year

Fig. 12

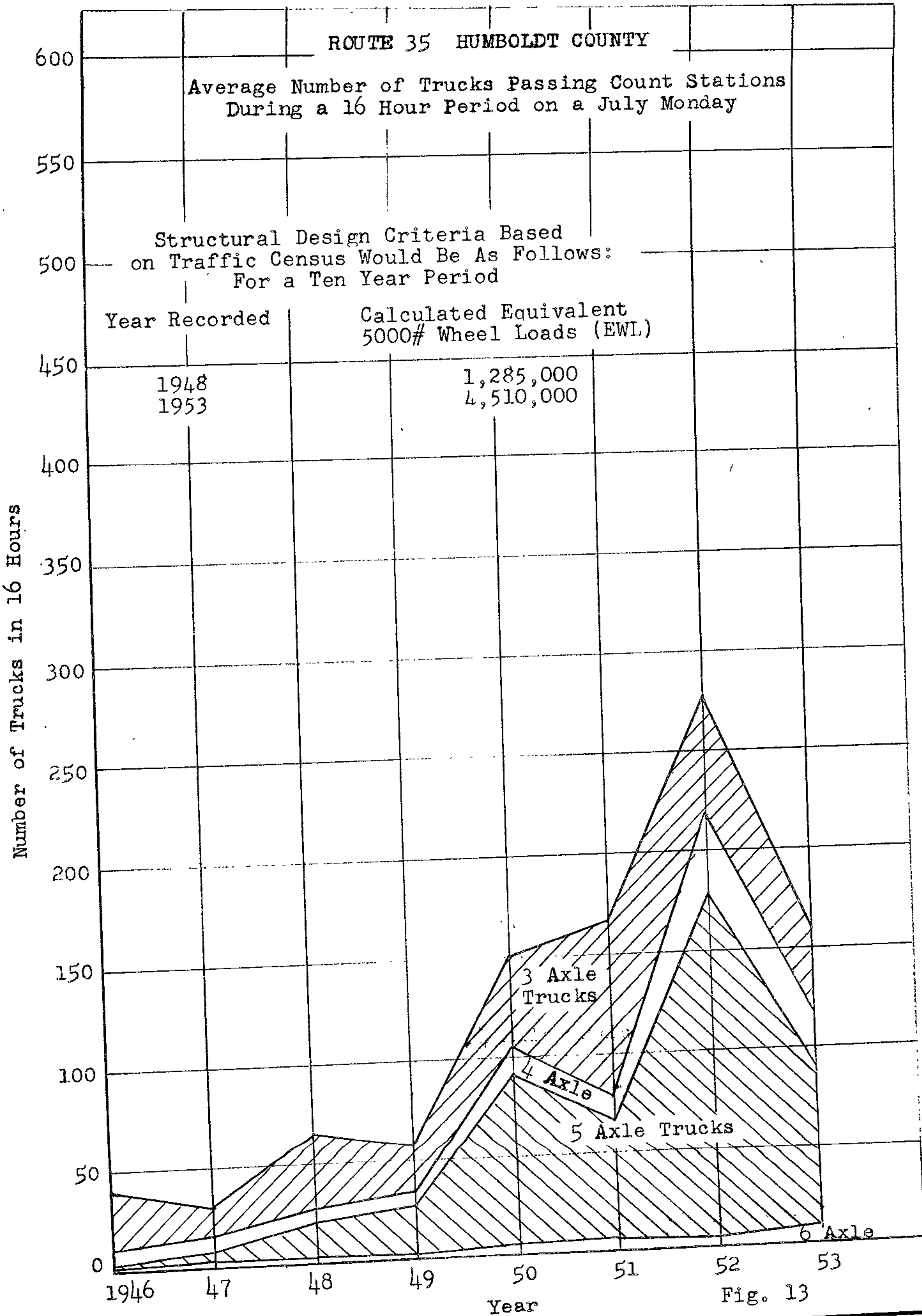

ROUTE 35 HUMBOLDT COUNTY
Average Number of Trucks Passing Count Stations
During a 16 Hour Period on a July Monday
Structural Design Criteria Based
on Traffic Census Would Be As Follows:
For a Ten Year Period
Year Recorded
Calculated Equivalent
5000# Wheel Loads (EWL)
1948
1953
1,285,000
4,510,000
600
550
500
450
400
350
300
250
200
150
100
50
0
Number of Trucks in 16 Hours
3 Axle
Trucks
4 Axle
5 Axle Trucks
6 Axle
1946
47
48
49
50
51
52
53
Year

Fig. 13

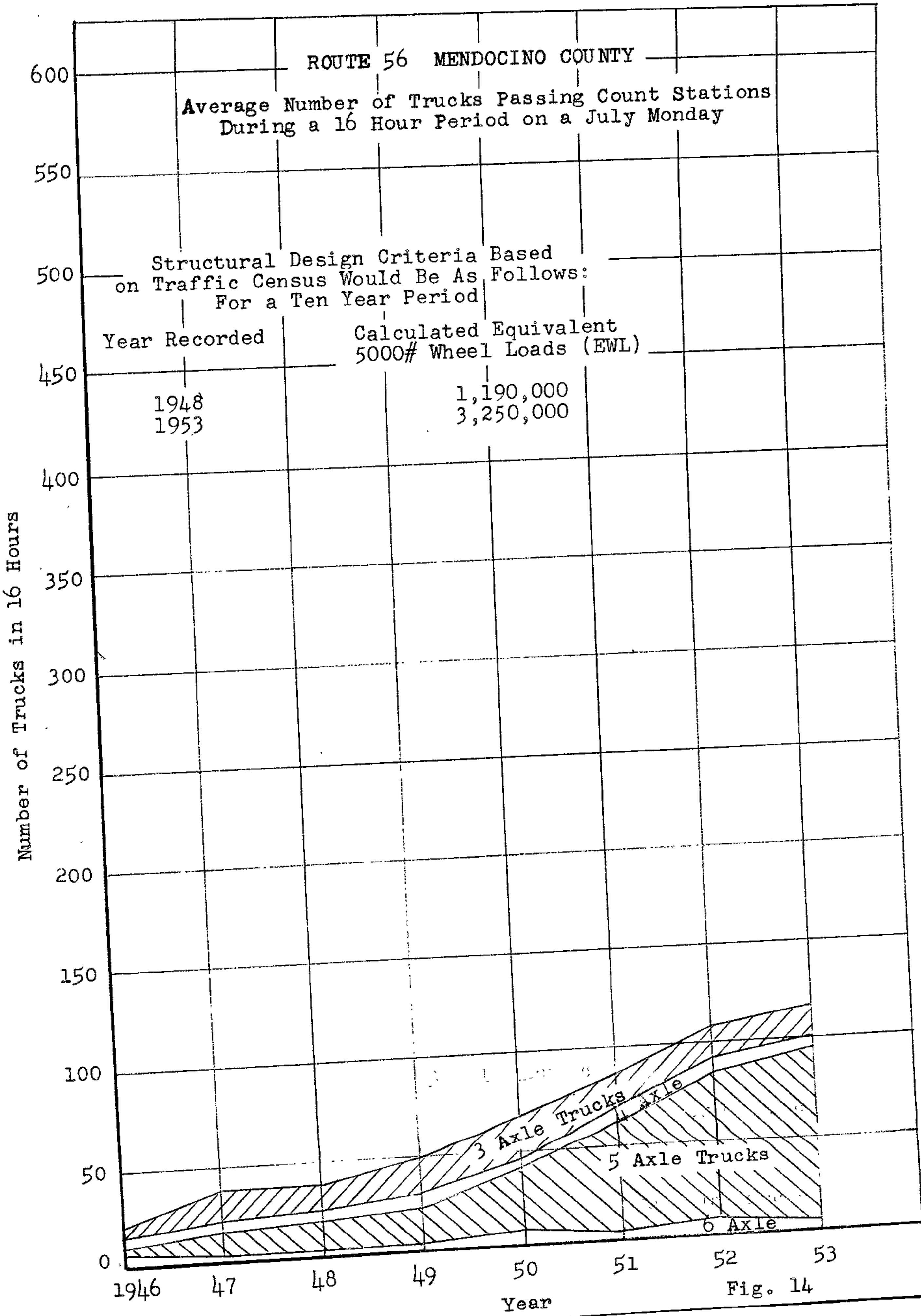
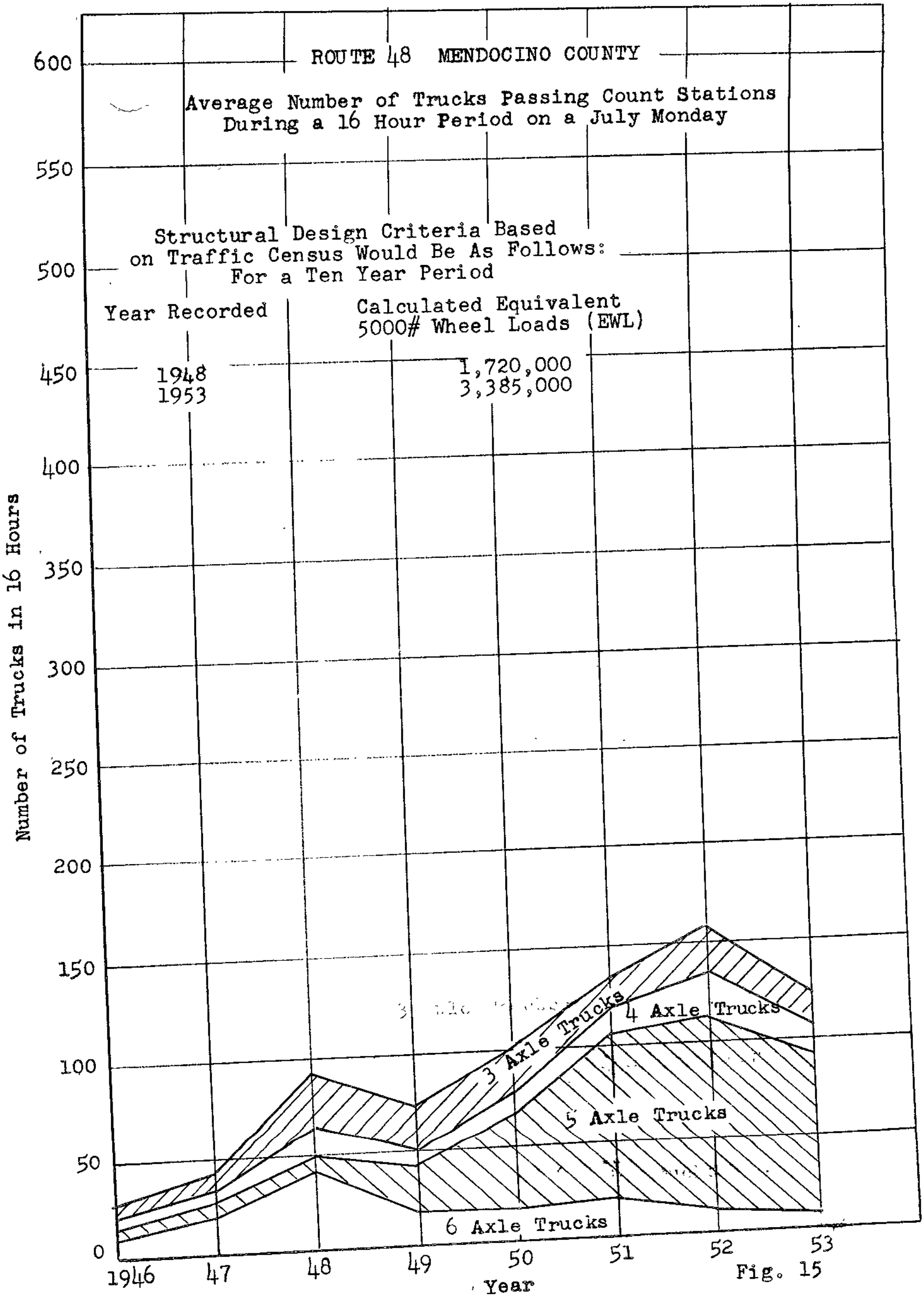
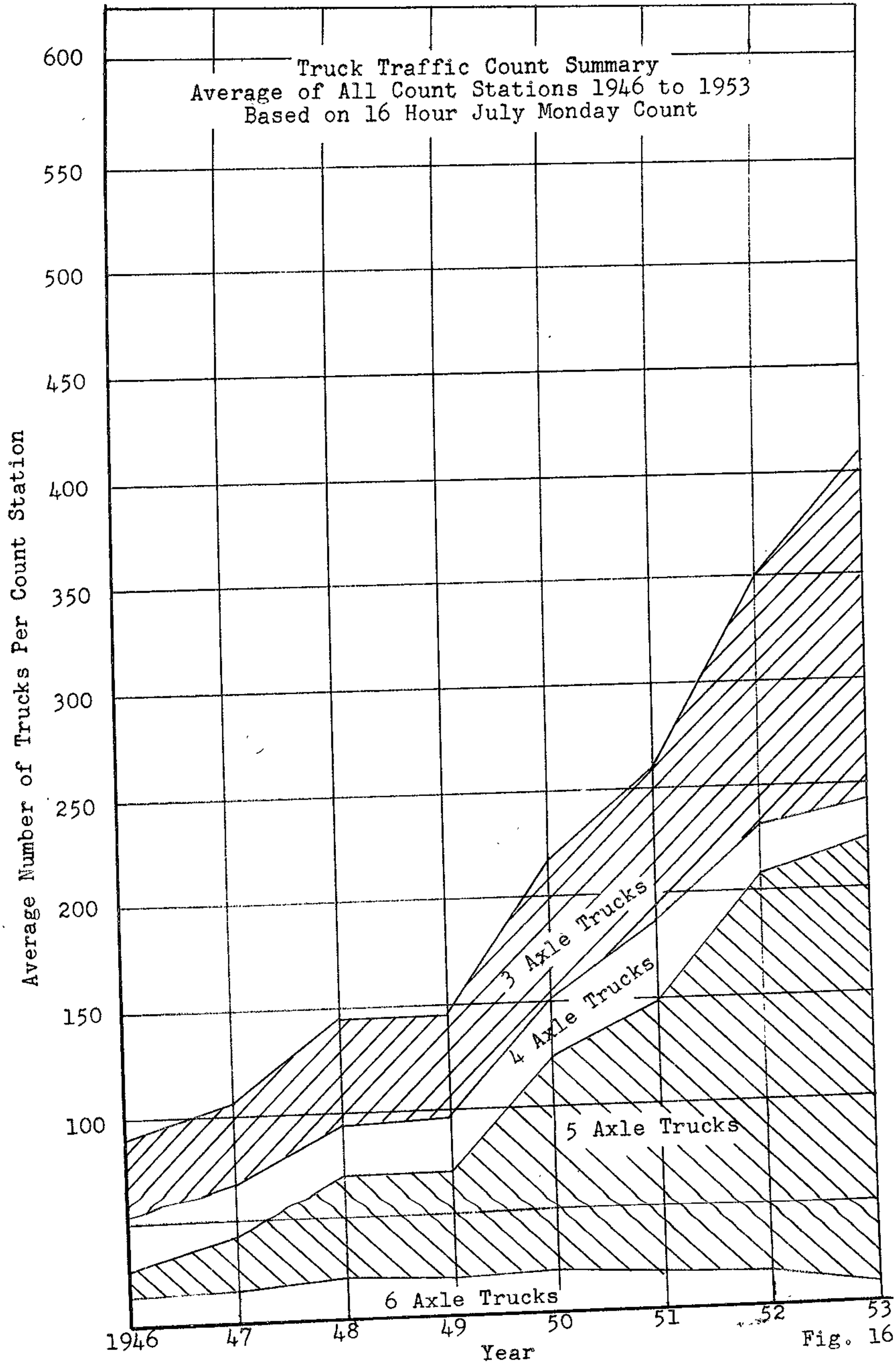

ROUTE 56 MENDOCINO COUNTY
Average Number of Trucks Passing Count Stations
During a 16 Hour Period on a July Monday
Structural Design Criteria Based
on Traffic Census Would Be As Follows:
For a Ten Year Period
Year Recorded
Calculated Equivalent
5000# Wheel Loads (EWL)
1948
1953
1,190,000
3,250,000
Number of Trucks in 16 Hours
600
550
500
450
400
350
300
250
200
150
100
50
0
3 Axle Trucks
4 Axle
5 Axle Trucks
6 Axle
1946
47
48
49
50
51
52
53
Year

Fig. 14



ROUTE 48 MENDOCINO COUNTY
Average Number of Trucks Passing Count Stations
During a 16 Hour Period on a July Monday
Structural Design Criteria Based
on Traffic Census Would Be As Follows:
For a Ten Year Period
Year Recorded
Calculated Equivalent
5000# Wheel Loads (EWL)
1948
1953
1,720,000
3,385,000
3 Axle Trucks
4 Axle Trucks
5 Axle Trucks
6 Axle Trucks
Number of Trucks in 16 Hours
600
550
500
450
400
350
300
250
200
150
100
50
0
1946
47
48
49
50
51
52
53
Year

Fig. 15



Truck Traffic Count Summary
Average of All Count Stations 1946 to 1953
Based on 16 Hour July Monday Count
Average Number of Trucks Per Count Station
600
550
500
450
400
350
300
250
200
150
100
3 Axle Trucks
4 Axle Trucks
5 Axle Trucks
6 Axle Trucks
1946
47
48
49
50
51
52
53
Year

Fig. 16

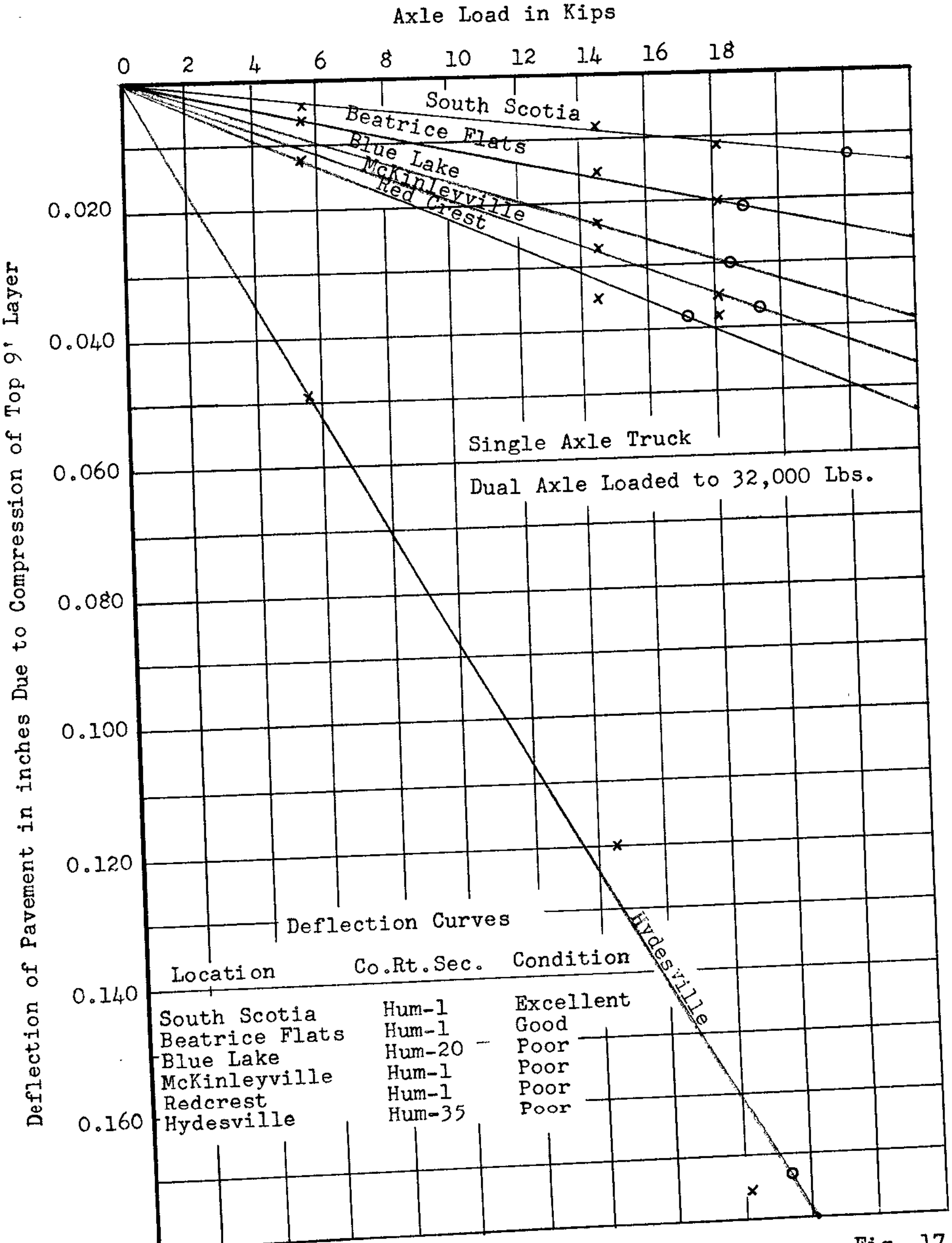

Axle Load in Kips
0
2
4
6
8
10
12
14
16
18
Deflection of Pavement in inches Due to Compression of Top 9' Layer
0.020
0.040
0.060
0.080
0.100
0.120
0.140
0.160
South Scotia
Beatrice Flats
Blue Lake
McKinleyville
Red Crest
Hydesville
Single Axle Truck
Dual Axle Loaded to 32,000 Lbs.
Deflection Curves
Location
Co.Rt.Sec.
Condition
South Scotia
Hum-1
Excellent
Beatrice Flats
Hum-1
Good
Blue Lake
Hum-20
Poor
McKinleyville
Hum-1
Poor
Redcrest
Hum-1
Poor
Hydesville
Hum-35
Poor

Fig. 17

Deflection of Pavement Due to Compression of Upper Nine Feet of Roadbed Under One 14,000 Pound Axle Load

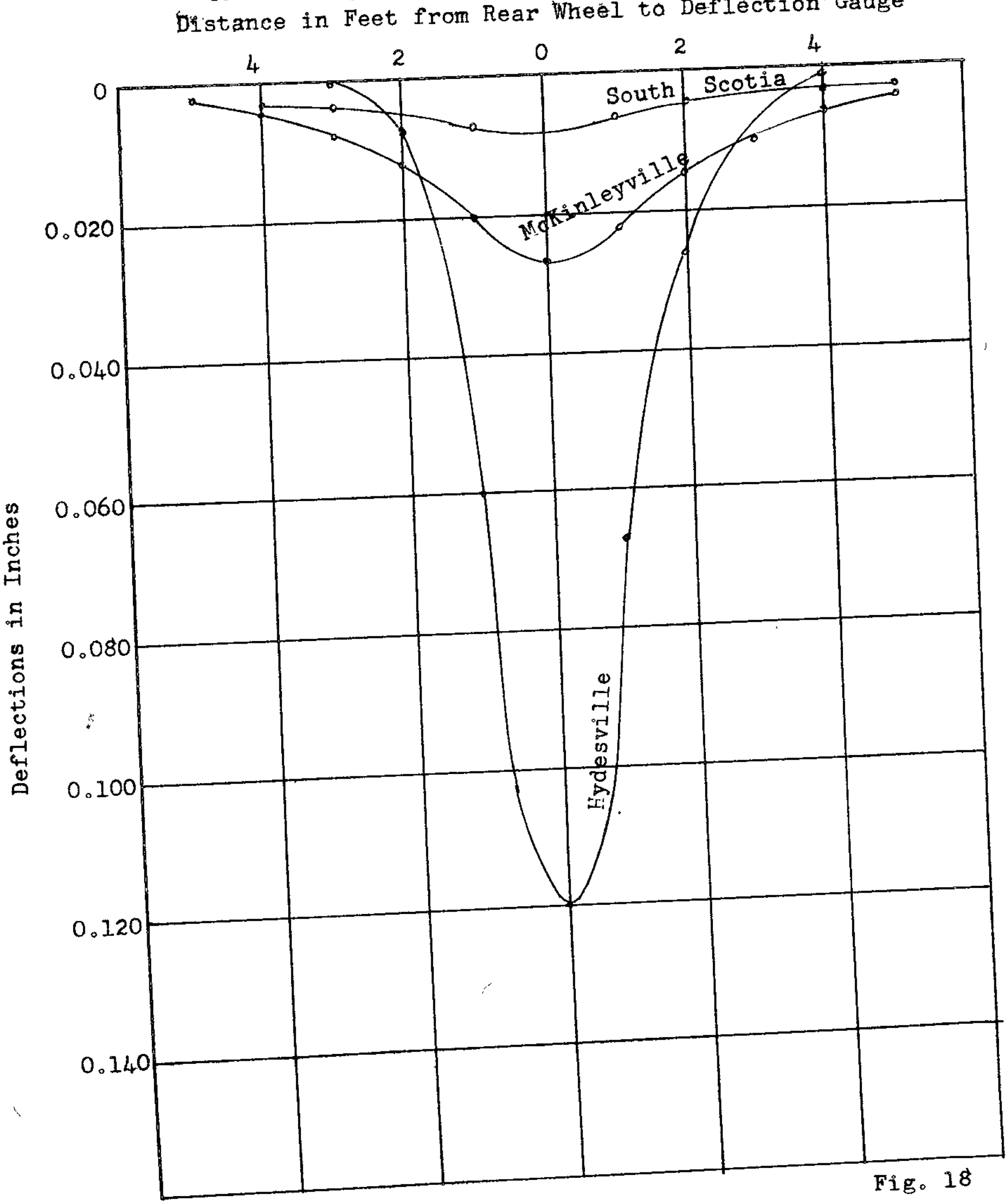


Fig. 18

TABLE I

Summary of Structural Condition Survey

Route	County	Miles of Road					
		Excellent	Good	Fair	Poor	Not Recorded	Total
1	Men	10.7	23.4	18.6	31.3	0	84.0
1	Hum	34.3	22.7	25.6	52.5	5.6	140.7
1	D.N.	13.8	3.7	1.4	7.7	0	26.6
71	D.N.	5.1	0	0	14.7	0	19.8
20	Hum	0.4	1.3	3.0	41.1	0	45.8
35	Hum	0	0	0	25.2	0	25.2
56	Men	4.9	0.8	2.2	28.6	1.1	37.6
48	Men	0	2.7	6.1	42.0	0	50.8
Total	—	69.2	54.6	56.9	243.1	6.7	430.5

TABLE II

Truck Traffic Counts in District I
By Routes For Years 1946 Through 1953
Based on July Monday Count

Year	County, Route and Section	Truck Traffic Count				Total
		3 Axle	4 Axle	5 Axle	6 Axle	
1946	Mendocino, Rt. 1	62	42	30	34	168
1947	"	61	40	37	35	173
1948	"	41	46	72	36	195
1949	"	38	30	68	33	169
1950	"	43	38	133	39	253
1951	"	61	48	196	25	330
1952	"	49	34	251	25	359
1953	"	66	22	311	17	417
	Calculated EWL for 1953 Traffic	46,200	35,000	650,000	27,100	
1946	Humboldt, Rt. 1	52	36	28	14	130
1947	"	47	38	44	20	149
1948	"	62	30	63	21	176
1949	"	89	61	91	23	264
1950	"	127	34	160	26	347
1951	"	157	30	192	20	399
1952	"	226	19	294	23	562
1953	"	196	18	321	8	535
	Calculated EWL for 1953 Traffic	137,500	25,200	660,000	12,800	
1946	Del Norte, Rt. 1	18	21	7	5	51
1947	" "	22	14	19	5	60
1948	" "	35	15	24	7	81
1949	" "	14	12	13	9	48
1950	" "	39	26	52	16	133
1951	" "	48	16	59	8	131
1952	" "	58	28	81	9	176
1953	" "	110	16	156	4	286
	Calculated EWL for 1953 Traffic	77,000	22,400	327,600	6,400	

Year	County, Route and Section	Truck Traffic Count				Total
		3 Axle	4 Axle	5 Axle	6 Axle	
1946	Humboldt, Rt. 20	35	19	6	0	60
1947	"	59	13	36	0	108
1948	"	73	15	45	5	138
1949	"	61	10	43	6	120
1950	"	74	15	67	9	165
1951	"	120	3	95	5	223
1952	"	255	5	153	7	420
1953	"	133	2	139	4	278
	EWL for 1953 Traffic	93,300	2,800	281,000	6,400	
1946	Humboldt, Rt. 35	28	10	1	0	39
1947	"	15	8	6	2	31
1948	"	41	4	20	2	67
1949	"	26	7	25	1	59
1950	"	47	11	87	5	150
1951	"	85	13	61	5	164
1952	"	63	39	175	3	280
1953	"	160	114	89	7	370
	EWL for 1953 Traffic	32,200	35,000	172,000	11,200	
1946	Mendocino, Rt. 48	11	6	3	10	30
1947	"	9	9	6	20	44
1948	"	27	13	9	41	90
1949	"	23	7	24	19	73
1950	"	22	12	50	16	100
1951	"	16	14	84	18	132
1952	"	26	21	101	11	159
1953	"	15	15	84	6	120
	EWL for 1953 Traffic	10,500	21,000	176,400	9,600	
1946	Mendocino, Rt. 56	5	5	1	7	18
1947	"	17	4	12	5	38
1948	"	12	4	16	5	37
1949	"	19	6	19	5	49
1950	"	23	2	33	7	65
1951	"	17	6	56	5	84
1952	"	17	5	75	9	106
1953	"	14	5	92	3	114
	EWL for 1953 Traffic	9,800	7,000	193,200	4,800	

Year	County, Route and Section	Truck Traffic Count				Total
		3 Axle	4 Axle	5 Axle	6 Axle	
1946	Del Norte, Rt. 71	20	16	2	0	38
1947	" "	25	25	9	8	67
1948	" "	43	23	30	4	100
1949	" "	12	20	10	11	53
1950	" "	51	41	52	13	157
1951	" "	87	30	58	7	182
1952	" "	90	42	104	14	250
1953	" "	210	14	172	8	404
	EWL for 1953 Traffic	147,000	19,600	361,200	12,800	

TABLE III

Deflection of Pavement Due to Compression of Upper Nine Feet of Roadbed

Location	Co.Rt.Sec.	Condition	Deflection in Inches			
			Single Axle Load			Dual Axle Load
			5.5 Kips	14 Kips	18 Kips	32 Kips
South Scotia	Hum-1	Excellent	0.004	0.008	0.011	0.013
Beatrice Flat	Hum-1	Good	0.006	0.015	0.020	0.021
Blue Lake	Hum-20	Poor	-	0.023	-	0.028
McKinleyville	Hum-1	Poor	-	0.027	0.035	0.038
Red Crest	Hum-1	Poor	0.012	0.035	0.038	0.038
Hydesville	Hum-35	Poor	0.049	0.120	0.175	0.173